

PROBLEMS AND PROSPECTS OF MAIZE CROP IN ESTERN ZONE OF BIHAR

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ABSTRACT

The paper attempts to analysis problems and prospects of maize crop in eastern zone of Bihar. Average proportion of male and female in sample households were found to be nearly 52.5 percent and 47.5 percent respectively. Average productivity level across major crops indicated that productivity of maize was comparatively higher in Khagaria than that of Bhagalpur district. Fellow farmers were major source of information to sample farmers followed by friends and relatives. Result shows that total household income was worked out to be Rs 135968.32 for Bhagalpur which was found comparatively higher than that of Khagaria (Rs. 95314.71) and regular salaried Job figured to be the second major source of income in both the districts. Rabi maize (including both winter and spring) contributed 80 percentage in the total maize production of Bihar. The average cost/ hac. of maize was Rs. 35013.36 while both irrigation cost and inputs cost constitute equally 25 percentage of the total cost of cultivation. Found that the input - output ratio of kharif maize, paddy and wheat crop were 1.67, 1.35 and 1.4 respectively while highest (1.91) was in hybrid cultivars of Rabi maize. Net return and benefit cost ratio of Rabi maize crop were Rs 31986.64 and 1.91 respectively. Found that 90 percentages farmers were using local variety for Kharif maize. Village's connectivity with market was the major (70 percentages) institutional constraint followed by insufficient and irregular supply of electricity. Lack of proper marketing facility in the study area was major (90 percentage) marketing constraint which is a great disappointing factor for the maize growers.

KEYWORDS: Maize, Returns, Cost of Cultivation, B: C Ratio and Constraints

INTRODUCTION

Maize is a cereal crop which is cultivated widely throughout the world and has the highest production among all the cereals. The worldwide production of maize was more than 960 million metric tonne in 2013-14. It is an important food staple in many countries and is also used in animal feed and many industrial applications. Maize is 3rd major crop in India after rice and wheat (Cox, R., 1956 & Reddy *et. al.* 2013). Maize is important cereal crop which provides food, feed, fodder and serves as a source of basic raw material for a number of industrial products viz, starch, protein, oil, food sweeteners, alcoholic beverages, cosmetics, bio-fuel etc, it is cultivated over 8.12 million hectare area with an annual production of 19.77 million tonnes and an average productivity of 2,435 kg ha⁻¹ (Maize Atlas of India, 2009 & Langade *et. al.* 2013). Maize also plays an important role in the livelihoods of millions of poor farmers in the developing world. Often, they are too poor to afford quality seeds and other essential inputs and are exposed to significant production and market risks. Together with rice and wheat, maize provides atleast 30 per cent of the food calories to more than 4.5 billion people in 94 developing countries (Von Braun *et. al.*, 2010, Kumar, *et. al.*, 2012). Maize is produced worldwide on 162 million hectares in more than 180 countries, including 125 developing countries with a total production of 844 million tonnes (FAOSTAT, 2012, Kumar, *et. al.*, 2012). The United States is the largest producer of maize oil. Brazil, China, Romania,

countries of the former Soviet Union, former Yugoslavia and South Africa also produce maize oil (Orthoefer *et. al.*, 2003). The area under maize cultivation in the period has increased at a CAGR of 2.2 per cent, from 146 million hectare in 2004-05 to 177 million hectare in 2013-14, the remaining increase in production is due to increase in yield. Productivity of maize has increased at a CAGR of 1.2 per cent, from 4.9 MT/hectare in 2004-05 to 5.5 MT/hectare in 2013-14 (CIMMYT 2005 & Singh, A.D. 2014). India is the fifth largest producer of maize in the world contributing 2 percentage of the global production. It is predominantly a kharif crop with 85 per cent of the area under cultivation in the season. It accounts for 9 per cent of total food grain production in the country. Maize production in India has grown at a CAGR of 5.5 per cent over the last ten years from 14 MnMT in 2004-05 to 23 MnMT in 2013-14. The area under maize cultivation in the period has increased at a CAGR of 2.5 per cent from 7.5 million hectare in 2004-05 to 9.4 million hectare in 2013-14, the remaining increase in production is due to increase in yield. Factors such as adaptability to diverse agro-climatic conditions, lower labour costs and lowering of water table in the rice belt of India have contributed to the increase in acreage. Productivity of maize (yield) has increased at a CAGR of 2.9 per cent from 1.9 million tonne/hac in 2004-05 to 2.5 million tonne /hectare in 2013-14. Maize is an important coarse grain cereal which is grown all the year round i.e. in kharif, Rabi and summer seasons in Bihar. The statistics of area under maize in Bihar reveals that Maize was grown on 650 (in 000 lakh hectare). The total production of Maize in Bihar was 1360 (in 000 tonnes), which accounted for a major share of Rabi and summer season.

The productivity of maize in Bihar was approximately 3321 kg/ha. (Govt of Bihar). The average productivity of Rabi and summer maize in the state is much higher as compared to national average indicating Bihar as an important maize producing state in India. Higher productivity of maize during rabi and summer season is due to mild and favourable temperature all along the growing season, better water management, more coverage of high yielding hybrids and composite varieties, ease in controlling harmful pest and diseases, better availability of plant nutrients, better weed control and food establishment of plants. However, important reason of low productivity in kharif season in Bihar is the least popularity of high yielding varieties, erratic weather condition, poor drainage system, more attack of diseases and pests, difficulty in controlling weeds, poor stand establishment, etc. However, due to very high yield potential of this crop during Rabi and summer seasons, most of the farmers prefer to grow maize either as a sole crop or as in intercrop with potato, cauliflower, tobacco etc. It has also provided food security to poor and needy persons in Bihar. The utilization pattern of maize has also changed in recent times. Approximately 55 % is used as poultry or animal feed, 25 per cent as human food, 16 per cent in industrial utilization as starch, pharmaceuticals and other industries, 1 per cent for dry milling, 2 per cent wastage during storage and transportation and 1 per cent for seed and other purposes. The state of Bihar acts as a main supplier of maize grain to other states for its utilization in feed and other industries. For human food it is mainly consumed as roti, bhuja and sattu. Recently, high yielding quality protein hybrid like Shaktiman- and Shaktiman -2 had been released which were instantaneously accepted by the farmers. These hybrids are providing not only food security but also nutritional security to consumers without any additional cost. As maize is grown all the year round in Bihar, the cultivation of baby corn, sweet corn, high oil corn and pop corn etc is gaining popularity amongst farmers which would open new vistas of maize based exports promotion.

RESEARCH MEHODOLOHGY

The study was based on primary as well as secondary data, primary data were collected through a diagnostic survey of the farmers/growers, traders and maize processors in the state in order to study existing cultivation and post

harvesting practices, storage systems, maize arrivals and price movements, marketing channels, value chains etc and identifying the factors constraining the growth of the sector at different levels of production and marketing. Primary data collection was done through well structured questionnaires and collates the critical information. The quantitative data was mainly collected by interviewing over 180 growers of two districts namely Bhagalpur and Khagaria in the Bihar. Secondary data was used for short-listing the target group for obtaining trade feedback and critical inputs from various stakeholders including government agencies. The short listing was done on the basis of following parameters i.e. Current area, production, productivity of all districts for maize production and Marketable surplus of maize in these districts.

RESULTS AND DISCUSSIONS

Result of the study shows that average 39 percent of the selected households were having less than one hectare land followed by up to 2 hectare (29.44 percent) and only 15 percent farmers of selected districts under study were having more than 4 hectare of land. It clearly indicated that average size of holding of maize growers were marginal and small farmers. Therefore we can conclude that despite of fact that maize production is labour and capital intensive crop, small and marginal farmers can easily incorporated in the cropping system. It can help in increase employment, enhance income and livelihood condition and improve nutritional status of households.

Table 1: Characteristics of Maize Grower in Sample Districts

Districts	Below 1ha	Up to 2ha	2 to 4 ha	Above 4ha	Over all
Bhagalpur	44(48.88)	26(28.88)	12(13.33)	8(8.87)	90(100)
Khagaria	26(28.88)	27(30)	17(18.88)	20(22.22)	90(100)
Overall	70(38.88)	53(29.44)	29(15.26)	28(15.56)	180(100)

(Figure in parenthesis indicates percentage of total)

SOCIO ECONOMIC PROFILE OF SAMPLE DISTRICTS

In Bihar, where a massive population (about 70 to 80 percentage) depends on agriculture, in intensification of maize production specially Rabi maize in selected district may yield substantial benefits average size of land holding in selected district was about 1.78 hectare/household for Bhagalpur and 2.59/ hectare for Khagaria under maize cultivation, it implies that distribution of land holdings in these two districts are skewed in favour of medium farmers what is of greater concern is the existence of joint family system, average household size was about 8.15 person/household and about 54 percentage of rural masses were having agriculture as the main occupation followed by business (46 to 47 percentage) and services creation of desired infrastructure to boost agricultural production in a daunting task and require huge investment over a considerably long span of time. As an interim strategy, IPNI tools offers immediate and ample scope for improving the social economic status of the people in survey district by facilitating the software to utilized the Fertilizer at optima level.

Table 2: Socio Economic Profile of Sample Farmers

S. No	Particulars	Bhagalpur	Khagaria
1	Male headed households (%)	100	100
2	Household size (No.)	8.15	5.1
3	Male Workers (No.)	3.05	2.7
4	Female Workers (No.)	1.78	.78
5	Year of Farming	25	17
6	Age of Household head (Years)	51	42
7	Education Level of household head (No. of years)	10.45	9.31

Table 2: Contd.,

8	Proportion belonging to forward castes (%)	62	71.11
9	Proportion with agriculture as the main occupation (%)	53	54
10	Proportion with business/service as secondary occupation (%)	47	46
11	No. of Person working off farm	1.04	1.47
12	Average size of land holding	1.78	2.59
13	Average No. of Plots	2.96	5.97
14	Ownership of two wheelers/bicycles (%)	100	100

Socio economic profile of sample farmers indicated that 100 percent households of sample villages headed by male. On an average, the proportion of male and female in sample households were found to be nearly 52.5 percent and 47.5 percent respectively. Further, it was observed from the table that out of total population nearly 53 percent of population had agriculture as main occupation in Bhagalpur However, for Khagaria it was 54.4 percent, followed by business and services respectively. Based on dependency ratio, it may be said that although the majority of female workers were found engaged in household works, but a substantial proportion was also engaged in agriculture, however, their involvement in non-agriculture occupation was very limited as compared to their counterparts. Education is considered as one of the most important indicators for development and have a look on data that levels of education for selected household head were lagged much behind as indicated by having only middle level i.e., 10.45 and 9.31 respectively for both of the district. One remarkable point has been observed during the survey that each household of both the district had nearly 100% of mobile ownership followed by ownership of two wheeler was observed.

It has already indicated in table that in selected districts maize farming is not a new things, they were engaged from approximately 21 years, but due to lack of proper marketing they sell their whole produce just after harvesting at only Rs.10- 12/kg to the village trader. Hence for improving the level of income, it should provide some incentive towards production of maize. It is not due to low adoption of technology but due to having lack of awareness about application of optimum level of existing resources in order to maximize the level of profit.

CROP YIELD OF MAIZE (QUINTAL/HECTARE)

Table 3: Crop Yield of Maize (Quintal/Hectare)

Crop	Bhagalpur	Khagaria
Kharif	18-20	-
Rabi (hybrid)	60.36	63.36

Average productivity level across major crops indicated that productivity of maize was comparatively higher in Khagaria than that of Bhagalpur district (secondary data analysis supports the findings). Average Yield of Rabi maize in Khagaria was estimated comparatively higher than Bhagalpur as indicated in table 4, with the only exception of a farmer reporting a yield of 1800kg/ha from a local variety in the kharif season of Bhagalpur sample. But some other crops like paddy, mung & lentil give better yield in Bhagalpur districts as a whole. Varieties –wise analysis indicated that hybrid varieties did better in particular location but it was observed that they were reaping only half of potential yield they obtain due to postharvest losses, germination problems, high disease infestation etc. Despite of these problems farmers have expressed their preference to grow the hybrid varieties of particular company in next season. It clearly indicates that maize crops were given equal importance as given to the wheat and paddy in selected sample under Bhagalpur districts.

SOURCES OF INFORMATION TO SAMPLE FARMERS IN 2012-13

Table 4: Sources of Information to Sample Farmers (2012-13)

Sources of Information	New Seed/Cultivar		Fertilizer Management		Pest Management		Disease Management	
	A	C	A	C	A	C	A	C
Input-dealers	3	2	3	3	4	3	4	3
Research station	2	5	2	2	2	1	2	1
Extension staff	6	7	4	7	3	4	3	4
T.V/Radio	5	4	6	4	5	5	5	5
Magazines/News paper	7	6	7	6	7	7	6	7
Fellow farmers	1	1	1	1	1	2	1	2
Friends/relatives	4	3	5	5	6	6	6	6

One (1) means highest importance and larger the number least important it is in terms of farmers consultation for the source of information of cultivars and agricultural practices related information. As shown in table despite of the KVK research station being located nearby from the farmers settlement, The surveyed farmers have not given top priority to the research station for agricultural related information and maize cultivar choices; but they have given top priority to fellow farmers (highest rank), followed by friends and relatives (2nd highest rank), and then to input dealers (3rd rank) in sample districts of Bihar.

INCOME FROM DIFFERENT SOURCE (RS/HOUSEHOLD)

Table 5: Income from Different Source (Rs/Household)

Particulars	Bhagalpur	Khagaria
Source of income from daily wages	363.68	659.05
Government	112.47	-
Private source	0.17	0.12
Annual income from farm	122144	69488.88
Annual income from non- farm	13348	25166.66
Total	135968.32	95314.71

It may be observed that total household income on an average was worked out to be Rs 135968.32 for Bhagalpur which was found comparatively higher than that of Khagaria (Rs. 95314.71), contribution of farm income in Bhagalpur was found comparatively higher than Khagaria. Regular salaried Job figured to be the second major source of income in both the districts i.e. contribution of non-farm income was estimated about Rs 25166.66 for Khagaria of Bhagalpur and Rs 13348/Year for Bhagalpur sample. It was further revealed that contribution of income to the total income from maize was higher in Khagaria but due to diversified cropping pattern adopted by Bhagalpur total contribution of farm income was found to be more. Thus we can say that majority of part of population of selected districts i.e. 53 % of total population mainly depend upon agriculture followed by business and services.

CROPPING PATTERN

There are two distinct maize cropping patterns in Bihar. In the flood prone areas of Khagaria, Saharsa (Kosi) and parts of Samastipur maize is being cultivated during Rabi season. In these districts sowing starts in October (after flood water recedes) and continues up to early January. The majority of the sowing is done during December. Maize harvest starts towards the end of February and continues till the end of June. Majority of the crop is harvested during the months of May and June. In these parts of Bihar maize is the major and in some cases the only crop.

Table 6: Cropping Pattern

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kharif												
Rabi												

Most of the maize cultivation is concentrated in the districts of Khagaria, Saharsa, Katihar and Purnea where it is grown only in Rabi, it can be concluded that the proportion of Rabi maize (including both winter and spring) in the total maize production of Bihar can be up to 80 percentage. This was also corroborated during discussions with farmer groups.

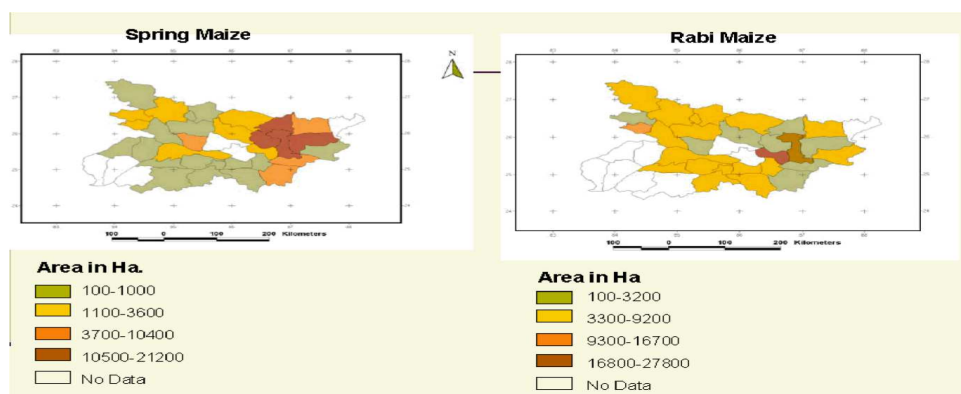


Figure 1: Major Maize Growing Districts in Bihar

Source: CGIAR

In kharif maize is scattered through-out Bihar as it is a rainfed crop. Map for kharif is not being captured by the satellite as the cropping density is below 100 hectare, hence no data is available.

PRACTICES IN MAIZE CULTIVATION IN BIHAR

Following Maize Cultivation Practices Were Observed In Sample Districts of Bihar

Land Preparation: the first step in maize cultivation is ploughing. Farmers use tractors to deep plough the land. Normally ploughing is done thrice to break down the soil. During ploughing 50 Kg of DAP, 50 Kg of Urea and 25 Kg of Potash is used along with some organic manure. At field level, there is very limited use of bio-techniques to protect the fertility of land for future crops. Chemical fertilizer is used to enhance the productivity but in long-run, it affects the fertility of land.

Sowing: Farmers on an average use around 27-30 Kg of seeds per hectare. This is about 20 percentages higher than the average seed requirement. The seed requirement is higher because of lower germination rate and high incidence of plant mortality. Line sowing was observed in most of the places.

Weeding: Normally weeding is done only once by the farmers when the plant is 3-4 weeks old. Approximately 10 labours are used per acre to carry out the process of weeding.

Irrigation: Normally the crop is irrigated 3 times but the number of irrigations can vary between 2-6 times depending upon the climate. Use of sprinklers and drift irrigation was not observed in the study area. Diesel motors attached to bore-wells are used to irrigate the crop. The cost of one time irrigation per ha is between Rs 2500.

THE CULTIVATION PRACTICES IN SAMPLE DISTRICTS OF BIHAR

Table 7: The Cultivation Practices in Sample Districts of Bihar

Practices	Bhagalpur	Khagaria	Effect
Seed Use	20- 30kg/ha	28-30kg/ha	Higher cost of cultivation
Thinning	Thinning is done at the time of weeding only	Thinning is done at the time of weeding only	Lesser growth of plants resulting in lower productivity
Spacing	No standard spacing was observed	No standard spacing was observed	Lower productivity
Fertilizer	220 Kg of Urea 100 Kg of DAP 5-10 Kg of Zinc every year	250 Kg of Urea 100 Kg of DAP 2 kg of Zinc	Higher cost of production Absence of balance nutrients for plant

Source: Field study.

However, the negative effects are getting neutralized due to higher soil fertility. But with better cultivation practices this yield can be improved further

COST OF CULTIVATION IN SAMPLE DISTRICTS

The average cost of maize cultivation in Bihar was Rs. 35013.36/ha, Inputs like seeds, fertilizers and constitutes about 25% of the total cost. The Rabi crop on an average is irrigated 5-6 times during a season. The irrigation cost contributes another 25% to the total cost of cultivation. The hiring charges of machinery (tractors, threshers etc) and labour for ploughing, planking, sowing, weeding and harvesting comes out to around Rs 9000/ha.

COSTS AND RETURNS OF MAIZE CULTIVATION IN SAMPLE DISTRICTS OF BIHAR

Table 8: Costs and Returns of Maize Cultivation

Particulars	Unit	Over all	Estimated Cost
No of ploughing	num	3	4500
No of irrigation	num	4	6905.6
Seed	kg/ha	20	3000
Nitrogen	kg/ha	109	654
Phosphorous	kg/ha	62.33	623
Potash	kg/ha	44.43	800
Zink	kg/ha	19.24	760
Organic manure	t/ha	15.75	1500
Plant protection			4232.44
Pesticide			325
Herbicide			325
Family labour day	day/ha	55.02	5856
Hired labour day	day/ha	42.61	4546
Interest on working capital			986.32
Total cost			35013.36
Grain yield	q/ha	55-60	
Straw	q/ha	100	66000
			1000
Total return			67000
Net return			31986.64
Cost Benefit Ratio			1.913555283

From estimated costs and returns, maize has found to be more profitable than its competing crop like paddy during the kharif season and wheat during the rabbi season in different villages under study. It was evident that the input - output ratio of even kharif maize crop was 1.67 than that of paddy (1.35) and wheat (1.4). Though it was the highest in hybrid cultivars of Rabi maize (1.91). The farmers were realizing the highest net return from maize during Rabi season (Rs 31986.64) and this is true for all districts of maize growers in the state (reference). Among total cost, production cost on fertilizer, irrigation and labour cost constitute about 70 percent of cost. It may be concluding that optimum use of input was not followed in expectation of getting higher returns.

ESTIMATION OF LABOUR USED BY SAMPLE HOUSEHOLD IN DIFFERENT PRODUCTION PRACTICES

Table 9: Estimation of Labour Used by Sample Household in Different Production Practice

Estimation of Labour Cost in Man day's						
Items	Family Labour (Days)	Family Labour (hr/days)	Total Cost	Hired Labour (Days)	Hired Labour (Wage Rate)	Total Cost
Land preparation	11.33	7.53	1630.1	9.58	143.87	1378.3
Planting	3.9	5.74	346.98	3.0	88.97	266.91
Fertilizer Application (B)	1.82	5.15	136.99	1.19	74.78	88.98
Labour Day exchange	0.91	0.0	68.05	0.5	74.78	37.39
Top dressing	1.44	4.41	104.27	1.39	72.41	100.7
Top dressing days exchange	0.88	0	63.728	0.1	72.41	7.24
Earthing	1.47	5.76	99.44	1.54	67.65	104.18
Hand Weeding	2.42	5.25	195.60	1.93	80.83	156.02
Herbicide Spraying	1.58	3.94	139.08	3.64	87.98	320.3
Irrigation	4.09	5.71	443.23	3.38	108.37	366.29
Insecticide & disease control	7.3	3.83	493.99	5.14	67.67	347.83
Harvesting	8.89	7.71	1307.0	5.33	147.02	783.62
Threshing	2.76	10.79	374.83	2.2	135.81	298.78
Drying	1.65	3.81	135.74	1.08	82.27	88.85
Shelling	2.12	2.54	148.12	0.56	69.87	39.27
Bagging	0.63	3.18	51.949	1.07	82.46	88.23
Storage	1.34	3.53	112.34	0.86	83.84	72.12
Marketing	0.49	0.09	6.0564	0.12	12.36	1.483
Total	55.02	78.97	5856.5	42.61	1553.3	4546.2
			Total Labour Cost		10402.72	

Estimated family and hired human labour/day used for different production practices i.e. from production to harvesting were found 55.02 and 42.61 man/day respectively @ Rs1553.35/day. The total cost associated as labour cost was Rs 5856.52 and Rs 4546.19 for performing different operation while maize cultivation.

It was visualized that maize proved to be profitable crop enterprises in all the selected districts of the state. Maize required less input as compared to its competing crop and gave almost same return per hectare as latter. In other words total earning from any crop were positively associated to the farm size, but on the basis of per unit area maize crop provided a better source of livelihood for small farmers. It also reduces the dependency of these farmers on the credit and

its various in-built implications. To augment the income of these resource poor farmers, there was a need to expand the maize area under high yielding hybrid cultivars along with betterment of minimum support price (MSP). Availability of market for the produce was the prerequisite for its adoption hence, there was an urgent need to provide suitable infrastructure in potential area which would pave a synergistic effect in the overall production of this crop.

PRODUCTION CONSTRAINTS

Constraint faced by the farmers in adoption of maize technology and its marketing related issue had been address and recorded in term of kind of input used, delay sowing, seed treatment use of recommended doses of fertilizer and other institutional constant ranked accordingly by weighted scale mean average score.

Table 10: Constraints in Maize Production

S. No.	Constraints	Bhagalpur	Khagaria
1	Cultivating local variety	V	V
2	Late sowing	II	III
3	Application seed treatment	IV	IV
4	Recommended dose of fertilizers	I	I
5	No. of irrigation	III	II

Above table shows that 90 percentages farmers were using traditional/ local variety for Kharif maize. However for Rabi maize all the farmers irrespective of level of income and size of folding were using hybrid seed of deferent companies for maize production. Regarding use of recommended doses of fertilizers not a single farmer under study were using optimum use of fertilizers and other input required for production practices like irrigation, proper weeding, use of plant protection measure etc. It was mainly because they were relatively poor, express that high cost was the main reason behind non adoption of proper production practices. Irrigation charges were also the main bottleneck especially in Bhagalpur district.

INSTITUTIONAL CONSTRAINTS

It is not only for maize production but was true for the entire crop in the study area. It is well known fact that good transportation facility it the key to the economic development of region. About 70 percentages of farmers were reported that they did not have their villages connected with metallic road to the market place directly. In sufficient and in regular supply of electricity was also the major constraints in these villages. Third important constraint is untimely credit availability in rural area and lack of Kishan credit card need to be pointed out here for discussion.

MARKETING CONSTRAINTS

Lack of proper marketing facility in the study area was another major constraint which is a great disappointing factor for the maize growers. It was observed that 90 percentage of the farmers in the selected district where selling their produced to the local traders due to absence of any regulated market or government procurement agency. The local traders procure the produce on their own terms and conditions. The farmer did not fetch higher prices for the same produce due to lack of storage facility. Regarding socio-economic constraint it was revealed that the price of maize was not remunerative. The government agency should procure the produce to protect the maize growers with minimum support prices are far from the reality. Therefore farmers of this district expected that government should provide such facilities instead of its emphasis on fertilizer and electricity subsidies.

CONCLUSIONS & POLICY IMPLICATION

Results found that average proportion of male were greater than female in sample households. Productivity of maize crop in Khagaria was comparatively higher than Bhagalpur district. Fellow farmers were major source of information to sample farmers. Result also shows that total household income of Bhagalpur was comparatively higher than Khagaria district. And Rabi maize which including both winter and spring contributed 80 percentages in the total maize production of Bihar. The average cost per hectare of maize was Rs. 35013.36 while both irrigation cost and inputs cost constitute equally 25 percentage of the total cost of cultivation. Found that the input - output ratio of kharif maize, paddy and wheat crop were less than hybrid cultivars of Rabi maize. Net return and benefit cost ratio of Rabi maize were Rs 31986.64 and 1.91 respectively. Found that 90 percentages farmers were using local variety for Kharif maize. Major institutional constraint was village's connectivity with market which affects farmers of village. Lack of proper marketing facility in the study area was major marketing constraint which is a great disappointing factor for the maize growers in the study area of research. Possibilities of building storage capacities in PPP format should be considered. Optimum utilization of nutrient based fertilizers should be used. Farmers must be are of low cost irrigation technology like drip and sprinkler irrigation system.

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